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International application number: PCT/GB05/000699

International filing date: 24 February 2005 (24.02.2005)

Document type: Certified copy of priority document

Document details: Country/Office: GB

Number: 0404357.6

Filing date: 27 February 2004 (27.02.2004)

Date of receipt at the International Bureau: 09 May 2005 (09.05.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



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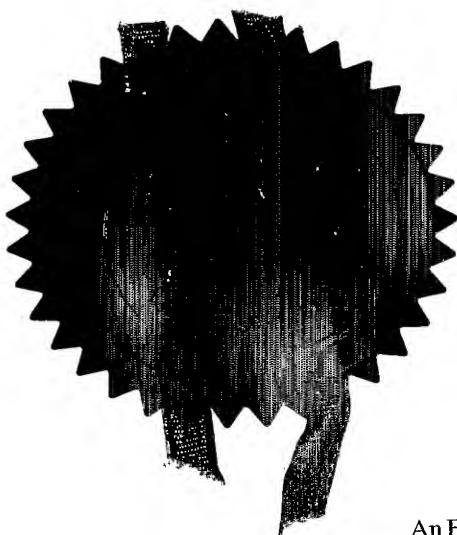
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1. Your reference

P36562-/NGR/GMU

23FEB04 5876722-2 1102884

2. Patent application number

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0404357.6

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Rocep Lusol Holdings Limited  
Rocep Business Park  
Rocep Drive  
Deanpark  
Renfrew  
PA4 8XY

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

6837674 00 2

4. Title of the invention

"Dispenser Valve with Adjustable Flow Rate"

5. Name of your agent (if you have one)

Murgitroyd & Company

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

165-169 Scotland Street  
Glasgow  
G5 8PL

Patents ADP number (if you know it)

1198015

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

Country

Priority application number  
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8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request?

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- there is an inventor who is not named as an applicant, or
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Continuation sheets of this form

Description	17
Claim(s)	
Abstract	
Drawing(s)	3

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Priority documents	-
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Signature(s)

*Murgitroyd & Co.* Date 26 Feb 2004

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

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1                   **DISPENSER VALVE WITH ADJUSTABLE FLOW RATE**

2

3       This invention relates to dispensing apparatus and

4       to a user operated valve assembly for use with a

5       dispensing apparatus. Particularly, but not

6       exclusively it relates to a dispensing apparatus and

7       valve assembly for dispensing viscous materials from

8       a container under pressure of a propellant.

9

10      It is known to provide a dispensing apparatus which

11      includes a valve mechanism fitted to a container

12      filled with a product, for example mastic or

13      sealant, which is to be dispensed. An example of

14      such an apparatus is disclosed in WO 01/49585 (Rocep

15      Lusol Holdings Limited). The user presses the

16      handle of a lever to open the valve and dispense

17      product from the pressurised container. However

18      such dispensers are intended for use only in

19      situations where a full flow of product is required.

20      There is no intermediate setting of the valve which

21      permits an intermediate flow rate, and it can be

1 difficult to ensure a steady stream of flow unless  
2 the valve is fully open.

3  
4 It is an object of the present invention to provide  
5 a dispensing apparatus which overcomes one or more  
6 of the above disadvantages.

7  
8 According to a first aspect of the present invention  
9 there is provided a valve assembly for use with a  
10 dispensing apparatus, the valve assembly comprising:

11       a valve;  
12        a lever having a bearing portion; and  
13        an actuator which co-operates with the bearing  
14       portion of the lever such that operation of the  
15       lever from a primed position to a dispensing  
16       position causes movement of the actuator to open the  
17       valve;

18        wherein the lever comprises an adjustable  
19       spacing means which can be adjusted to limit the  
20       travel of the lever.

21  
22       Preferably the adjustable spacing means comprises an  
23       abutting member which is movable to a selected one  
24       of a plurality of positions. Preferably the  
25       abutting member is adapted to space the lever from a  
26       container with which the valve assembly is used at  
27       the limit of travel of the lever.

28  
29       Preferably the abutting member is arranged such that  
30       for each of the plurality of positions of the  
31       abutting member there is a corresponding position of  
32       the lever at the limit of travel of the lever.

1       Preferably the lever includes a handle which in use  
2       extends along a portion of the side of a container  
3       with which the valve assembly is used. Preferably  
4       the adjustable spacing means is provided at the  
5       handle. Preferably the lever is substantially L-  
6       shaped. The angle of the L-shape may be understood  
7       to be between approximately 60 degrees and 120  
8       degrees, depending on the shape of the container  
9       with which the valve assembly is used. Preferably  
10      the bearing portion is provided on a first leg of  
11      the L-shape and the handle is provided on the other,  
12      second leg of the L-shape.

14      Preferably the valve assembly includes fixing means  
15      for fixing the valve assembly to a container. The  
16      fixing means may be a mounting cup.

18      Preferably the lever is pivotally connected to the  
19      valve assembly by a hinge. Preferably the hinge is  
20      at the free end of the first leg of the L-shape.  
21      The hinge may be provided on a collar secured to the  
22      valve. The collar may be secured by the fixing  
23      means.

25      In one embodiment the actuator is provided with a  
26      cam surface which co-operates with the lever bearing  
27      portion, such that upon rotation of the actuator the  
28      lever bearing portion is raised by action of the cam  
29      surface.

1 Preferably the cam surface comprises one or more  
2 depressions and one or more raised surfaces.

3  
4 Preferably the lever has two lever bearing portions  
5 arranged at opposite sides of the valve. Preferably  
6 the actuator is a ring and the cam surface comprises  
7 two depressions arranged at opposite sides of the  
8 ring and two raised surfaces arranged between the  
9 depressions at opposite sides of the ring.

10  
11 In a further embodiment the actuator is threadedly  
12 engaged with a valve stem of the valve. Preferably  
13 the actuator is provided with a bearing surface  
14 which co-operates with the lever bearing portion,  
15 such that upon rotation of the actuator relative to  
16 the valve stem the lever bearing portion is raised  
17 by action of the bearing surface.

18  
19 Preferably the valve assembly includes a nozzle  
20 which is rotationally coupled to the actuator.  
21 Preferably the actuator comprises a ring member  
22 arranged at a lower end of the nozzle. The actuator  
23 may be integral with the nozzle.

24  
25 Preferably the actuator is provided with means to  
26 limit the rotational travel of the actuator. These  
27 means may comprise two end stops provided on the  
28 actuator adapted to locate against an upstand on the  
29 valve assembly.

30  
31 Preferably the valve is a tilt valve. Tilt valves  
32 are generally known in dispensing apparatus and

1 operate by tilting of a hollow central stem which is  
2 resiliently held on a mounting cup by a rubber  
3 grommet. The stem is closed at its lower end by a  
4 sealing plate. When the stem is tilted, the seal  
5 between the grommet and the sealing plate is broken  
6 and the product can reach apertures in the central  
7 stem and thence flow along the hollow stem.

8

9 Preferably the actuator comprises one or more dog  
10 teeth and the hinge assembly comprises one or more  
11 slots, adapted such that a dog tooth can enter a  
12 slot only when the nozzle assembly is in the open  
13 position. The nozzle assembly is preferably coupled  
14 to the valve stem for longitudinal movement, such  
15 that movement of the nozzle assembly towards the  
16 container causes the dog tooth to enter the slot and  
17 the valve stem to move, thereby opening the valve to  
18 release the product.

19

20

21 According to a second aspect of the present  
22 invention there is provided a dispensing apparatus  
23 comprising a container, a nozzle and a valve  
24 assembly arranged between the container and the  
25 nozzle, the valve assembly comprising:

26        a valve;  
27        a lever having a bearing portion; and  
28        an actuator which co-operates with the bearing  
29        portion of the lever such that operation of the  
30        lever from a primed position to a dispensing  
31        position causes movement of the actuator to open the  
32        valve;

1           wherein the lever comprises an adjustable  
2       spacing means which can be adjusted to limit the  
3       travel of the lever.

4  
5       Preferably the adjustable spacing means comprises an  
6       abutting member which is movable to a selected one  
7       of a plurality of positions. Preferably the  
8       abutting member moves by sliding. Preferably the  
9       abutting member is adapted to engage resiliently in  
10      each of the plurality of positions.

11  
12      Preferably the lever has a handle portion.  
13      Preferably the abutting member is adapted to space  
14      the handle portion of the lever from the container  
15      at the limit of travel of the lever.

16  
17      Preferably the abutting member is arranged such that  
18      for each of the plurality of positions of the  
19      abutting member there is a corresponding position of  
20      the handle at the limit of travel of the lever.

21  
22      Preferably the valve assembly is a valve assembly  
23      according to the first aspect of the invention.

24  
25      Preferably the actuator is provided with a cam  
26      surface which co-operates with the lever bearing  
27      portion. Preferably the actuator is rotationally  
28      coupled to the nozzle.

29  
30      Preferably the apparatus comprises means for urging  
31      the product from the container. Preferably the  
32      container is pressurised. The container may contain

1 a propellant. The container may contain a piston,  
2 situated between the propellant and the valve.

3

4 Preferably the valve comprises a mounting cup  
5 adapted to secure the valve to the container.  
6 Preferably the container is provided with a rolled  
7 flange portion and the mounting cup is provided with  
8 a corresponding flange portion adapted to engage  
9 with the rolled flange portion of the container.

10

11 Specific embodiments of the invention will now be  
12 described, by way of example only, with reference to  
13 the accompanying drawings in which:

14

15 Fig. 1 shows a valve assembly according to the  
16 invention;

17

18 Fig. 2 is a side elevation on the valve  
19 assembly of Fig. 1 with the lever in a parked  
20 position;

21

22 Fig. 3 is a side elevation on the valve  
23 assembly of Fig. 1 with the lever in a primed  
24 position;

25

26 Fig. 4 shows a section through the valve  
27 assembly of Fig. 1 with the lever in the primed  
28 position;

29

30 Fig. 5 shows a section through the valve  
31 assembly of Fig. 1 with the lever in a dispensing  
32 position with an intermediate flow setting;

1

2       Fig. 6 shows a section through the valve  
3 assembly of Fig. 1 with the lever in a dispensing  
4 position with a full flow setting;  
5 the primed position;

6

7       Fig. 7 is a plan view on the hinge collar of  
8 the valve assembly of Fig. 1;

9

10       Fig. 8 is a side view on the nozzle and  
11 actuator of the valve assembly of Fig. 1;

12

13       Figs. 9, 10 and 11 show a perspective view, a  
14 longitudinal section and a transverse section  
15 respectively of the adjustable spacer of a valve  
16 assembly according to the invention; and

17

18       Figs. 12 and 13 show the adjustable spacer and  
19 the abutting member respectively of another valve  
20 assembly according to the invention.

21

22       Referring to Figs. 1 to 6 of the accompanying  
23 drawings, there is disclosed a valve assembly 10  
24 fitted on a container 12 to form a dispensing  
25 apparatus 11. In this example, the container 12 is  
26 an aluminium monoblock container of the sort widely  
27 used in aerosol applications. It is envisaged that  
28 the can 12 could be of tin plate, steel or any  
29 conventional can construction having a standard one  
30 inch (25 mm) hole in the top. The can may be  
31 internally lacquered. However the valve assembly of  
32 the present invention can be used with a container

1 12 of any material holding a pressurised product,  
2 for example a container of plastic, glass or metal.

3  
4 The valve assembly 10 includes a valve 14, a hinge  
5 collar 16, a lever 18 and an actuator 20 including a  
6 nozzle 22. The valve is a tilt valve of the type  
7 widely used in pressurised dispensers and operated  
8 by tilting the valve stem 30. The valve stem 30 is  
9 a hollow plastic tube with apertures 32 in the tube  
10 wall at the lower end. The upper end 34 is open,  
11 while the lower end is closed by a plastic sealing  
12 disc 36. A resilient grommet 38 of rubber or  
13 synthetic material surrounds the lower portion of  
14 the stem 30 and is held in place by the sealing disc  
15 36 and a retaining collar 31 formed on the outside  
16 of the stem 30.

17  
18 The grommet 38 is sealed to a mounting cup 44 of  
19 metal. The mounting cup has an outer flange 48  
20 which is adapted to fit around a rolled flange 13  
21 which extends around the opening of the container  
22 12. When the stem 20 is pushed in the direction of  
23 arrow A relative to the mounting cup 44, the sealing  
24 disc 36 is pushed away from the grommet 38, and  
25 material in the container 12 is free to pass between  
26 the sealing disc 36 and grommet 38, through the  
27 apertures 32, along the inner bore of the stem 30  
28 and through the open end 34 of the stem. When the  
29 stem is released, the resilience of the grommet 38  
30 pushes the stem back in a direction opposite to  
31 arrow A and seals the valve again.

1 The hinge collar can be seen more clearly in Fig. 7.  
2 The hinge collar 16 is moulded from plastic and  
3 comprises a ring 60 having a central aperture 62.  
4 The ring 60 is provided with a circumferential  
5 groove 64 adapted to snap on to the outer flange 48  
6 of the mounting cup 44. A discontinuous flange 66  
7 projects into the aperture 64, forming two slots 68,  
8 whose purpose is explained later. An upstand 70 is  
9 provided with a through bore 72 adapted to house the  
10 ends of a wire lever 18, thereby forming a hinge for  
11 the lever. The lever 18 comprises a handle 102,  
12 which extends along the side of the container 12,  
13 and a lever arm 104. The lever 18 is preferably  
14 formed from a single piece of wire, whose two free  
15 ends are mounted in opposite sides of the upstand  
16 70. However the lever is not limited to such a  
17 construction. For example the lever may be a  
18 moulded plastic handle, and may be formed in one  
19 piece with the hinge collar, with a resilient  
20 plastic hinge connecting the hinge collar and lever.  
21

22 The actuator 20 can be seen more clearly in Fig. 8  
23 and includes an elongate tapering nozzle 22 with a  
24 removable end cap 82 (shown in Figs. 1 and 2), which  
25 may be click-fit, screw-fit or simple taper fit.  
26 The actuator 20 is free to rotate about its  
27 longitudinal axis relative to the hinge collar 16  
28 and lever 18. Although in the illustrated example  
29 the nozzle 22 is integral with the actuator 20 it is  
30 to be understood that they may be formed separately  
31 and coupled so that one rotates with the other.  
32

1       Rotation of the actuator can be limited by the  
2       provision of end stops (not shown), which come into  
3       contact with corresponding contact surfaces formed  
4       on the hinge assembly 16. The first end stop can be  
5       arranged such that when it is in contact with the  
6       contact surface, the actuator is in the closed  
7       position as shown in Figs 1 and 2. If the actuator  
8       20 is rotated by 90° in a counter-clockwise  
9       direction, so that the second end stop is in contact  
10      with its contact surface, then the actuator is in  
11      the open position, as shown in Fig 3.

12

13      When the dispenser is transported and is stored  
14      before first use, a removable tab 86 attached to a  
15      fin 92 of the nozzle assembly prevents any rotation  
16      of the nozzle from the closed position by engaging  
17      in a slot 88 on the upstand 70. Only after removal  
18      of the tab, by folding and snapping or tearing, can  
19      the nozzle be rotated. It is to be understood that  
20      the provision of a locking tab 86 is optional, and  
21      the invention may function without a locking tab.

22

23      The actuator 20 is provided with four fins, two  
24      shorter fins 92 and two longer fins 94. The base 90  
25      of the actuator controls the opening of the valve  
26      and is provided with a cam surface which has two  
27      depressions 98 adjacent to the longer fins 94 and  
28      two raised surfaces 96 adjacent to the shorter fins  
29      92. The lever arm 104 of the lever 18 has a bearing  
30      portion 100 which is adapted to fit on the  
31      depression 98 when the actuator is in the closed  
32      position. Upon rotation of the actuator 20, the cam

1 surface pushes the bearing portion 100 up until it  
2 is raised to the level of the raised surface 96,  
3 where it is held between the shorter fin 92 and the  
4 raised surface 96.

5  
6 As the bearing portion 100 is raised, the handle 102  
7 on the lever 18 is moved away from the side of the  
8 container 12, from the parked position shown in Fig  
9 2 to the primed position shown in Fig 3.

10  
11 In a further screw thread embodiment of the  
12 invention, not illustrated, the actuator 20 is  
13 threadedly engaged with the valve stem 30 of the  
14 valve 14. The actuator 20 is provided with a  
15 bearing surface which co-operates with the lever  
16 bearing portion 100, such that upon rotation of the  
17 actuator relative to the valve stem 30 the lever  
18 bearing portion 100 is raised by action of the  
19 bearing surface, so that the lever 18 is moved from  
20 a parked position to a primed position.

21  
22 Referring again to Figs. 1 to 8, the base 90 of the  
23 actuator 20 is provided with a cylindrical extension  
24 110 which has an internal diameter adapted to fit  
25 slidably around the inner flange of the mounting cup  
26 44. The inner surface of the cylindrical extension  
27 110 engages with a protruding part 41 of the grommet  
28 38 adjacent to the groove 40, to form a seal which  
29 prevents the product passing between the valve 14  
30 and the nozzle 22.

1       Arranged outside the extension 110 are two dogs 112,  
2       which in the closed position of the actuator (as in  
3       Fig 2) are aligned on top of the flange 66 in the  
4       hinge assembly. In this position the nozzle  
5       assembly 20 cannot be moved in the direction of  
6       arrow A relative to the hinge assembly 16, because  
7       the dogs 112 will interfere with the flange 66.  
8       However, when the actuator 20 is rotated to the  
9       primed or open position (as in Fig 3) the dogs 112  
10      are aligned with the slots 68 formed by the gaps in  
11      the flange 66, and the nozzle assembly 20 can be  
12      moved in the direction of arrow A, so that the dogs  
13      112 enter the slots 68.

14  
15      It is to be understood that the nozzle assembly may  
16      be provided with only one dog 112, and the hinge  
17      assembly with only one slot 68.

18  
19      When the actuator is in the primed or open position,  
20      as in Fig 3, then depression of the handle 102  
21      towards the container 12 causes the bearing portion  
22      100 of the lever 18 to push the actuator 20 in the  
23      direction of arrow A towards the hinge assembly 16.  
24      The actuator 20 is linked to the valve stem 30 to  
25      prevent relative longitudinal movement of the valve  
26      14 and nozzle 22. The linking means may comprise a  
27      thread or a rib and groove arrangement.

28  
29      As can be seen in Fig 5, a shoulder 120 on the  
30      inside of the actuator 20 bears on the collar 31 on  
31      the outside of the valve stem 30 and pushes the  
32      valve stem against the resilience of the grommet 38

1 in the direction of Arrow A. This causes the disc  
2 36 to move away from the grommet and allow product  
3 to be expelled under pressure from the container  
4 through the nozzle 22.

5  
6 The actuator and nozzle assembly 20 is a single  
7 moulded piece of plastic. The nozzle assembly 20,  
8 the hinge assembly 16 and the lever 18 can be  
9 preassembled to form a complete nozzle/hinge sub-  
10 assembly and then secured to the container 12 during  
11 the filling process. In practice the container is  
12 filled, the valve 14 is secured to the container by  
13 crimping the flange 48, then the nozzle/hinge sub-  
14 assembly is snapped onto the mounting cup of the  
15 valve.

16  
17 Before filling the container 12 with product and  
18 before fitting the valve and nozzle/hinge assembly,  
19 a piston assembly (not shown) is inserted into the  
20 container 12. A suitable piston assembly is  
21 described in our co-pending International Patent  
22 Application No PCT/GB98/03003. However the piston  
23 assembly does not form part of the present  
24 invention, and any suitable automatic or manual  
25 pressure inducing arrangement may be used in  
26 connection with the apparatus of the present  
27 invention, including conventional aerosol cans.

28  
29 To dispense a product, the tab 86 is broken, the end  
30 cap 82 is removed and the nozzle 22 may be cut open,  
31 if it is not supplied already open. The actuator 20  
32 is then twisted relative to the hinge assembly 16.

1 Twisting is made easy by the provision of the four  
2 fins 92, 94, which are readily grasped by hand. A  
3 90° turn will fully open the pack. As the actuator  
4 20 turns from the closed position of Fig 2 to the  
5 primed position of Fig 3, the lever handle 102 lifts  
6 on the hinge 72 due to the action of the camming  
7 surface 96, 98 against the bearing portion 100 of  
8 the lever arm 104.

9  
10 To dispense product, a user then presses down on the  
11 lever handle 102, moving it from the primed position  
12 shown in Fig 4 towards the body of the container 12  
13 to adopt the dispensing position shown in Fig 5 or  
14 6.

15  
16 As seen more clearly in Figs 9 to 11, the handle 102  
17 includes a plate 120, typically of moulded plastic,  
18 which may be fixed by snap fit or sliding onto the  
19 wires 122 which form the handle. The plate 120 is  
20 provided with an adjustable spacing means 124 in the  
21 form of an abutting member 126 which is held in a  
22 slot 128 in the plate 120. The abutting member 126  
23 has a thumb grip 130 and can slide longitudinally  
24 along the handle 102. When the abutting member 126  
25 is in a first position shown in Fig 5, the handle  
26 102 can only move a limited distance towards the  
27 container 12 to a first dispensing position, so that  
28 the valve 14 is only opened to an intermediate flow  
29 position. When the abutting member 126 is in a  
30 second position shown in Fig 6, the handle 102 can  
31 move a greater distance towards the container 12 to

1 a second dispensing position, so that the valve 14  
2 is opened to a fully open flow position.

3  
4 It is to be understood that detent formations may be  
5 formed in the abutting member 126 and/or plate 120  
6 so that the adjustable spacing means 124 is readily  
7 set at the required dispensing position. If the  
8 abutting member 126 is moved to further intermediate  
9 positions, then the valve 14 may be opened to  
10 further intermediate flow positions. There may be  
11 two, three or more intermediate dispensing  
12 positions.

13  
14 The plate 120 and/or thumb grip 130 are provided  
15 with markings 132 which indicate the position to  
16 which the abutting member 126 must be moved to  
17 achieve a particular flow position. The flow  
18 position may be set while the lever 18 is in the  
19 parked or primed position, so that pressing the  
20 handle 102 towards the container 12 from the primed  
21 position results in the required flow rate of  
22 product. The abutting member 126 effectively spaces  
23 the handle 102 from the container 12 at the limit of  
24 travel of the lever 18. The abutting member 126 is  
25 arranged such that for each of a plurality of  
26 positions of the abutting member 126 there is a  
27 corresponding position of the lever 18 at the limit  
28 of travel of the lever.

29  
30 When the valve is open product is urged to flow, by  
31 virtue of the internal pressurisation of the pack,

1 through the ports 32 and up through the valve stem  
2 30 and out through the nozzle 22.

3

4 To stop dispensing, the user simply releases the  
5 lever handle 102. This closes the valve by allowing  
6 the valve stem 30 to slide back and close access  
7 through the ports 32.

8

9 The abutting member 126 may be of any suitable shape  
10 or size which can be positively engaged in the slot.  
11 In the example of Figs 9 to 11 the member 126  
12 includes split legs 134 having detent portions 136  
13 to non-removably engage with the slot. Figs 12 and  
14 13 show an alternative form of abutting member 126',  
15 which may be engaged by pushing through the thumb  
16 grip portion 130' through the slot 128 in the  
17 resilient plate 120. However the abutting member  
18 may be a simple sliding device slidably mounted on  
19 the wire 122 of the handle 102, or a device which  
20 slidably engages with the edge of the handle plate  
21 120.

22

23 Modifications and improvements may be made to the  
24 foregoing without departing from the scope of the  
25 invention. In particular the means of coupling  
26 vertical movement of the bearing portion 100 of the  
27 lever with opening of the valve is not limited to  
28 the embodiments described above, and the adjustable  
29 spacing means of the valve assembly of the invention  
30 may be used with any suitable valve, lever and  
31 actuator.

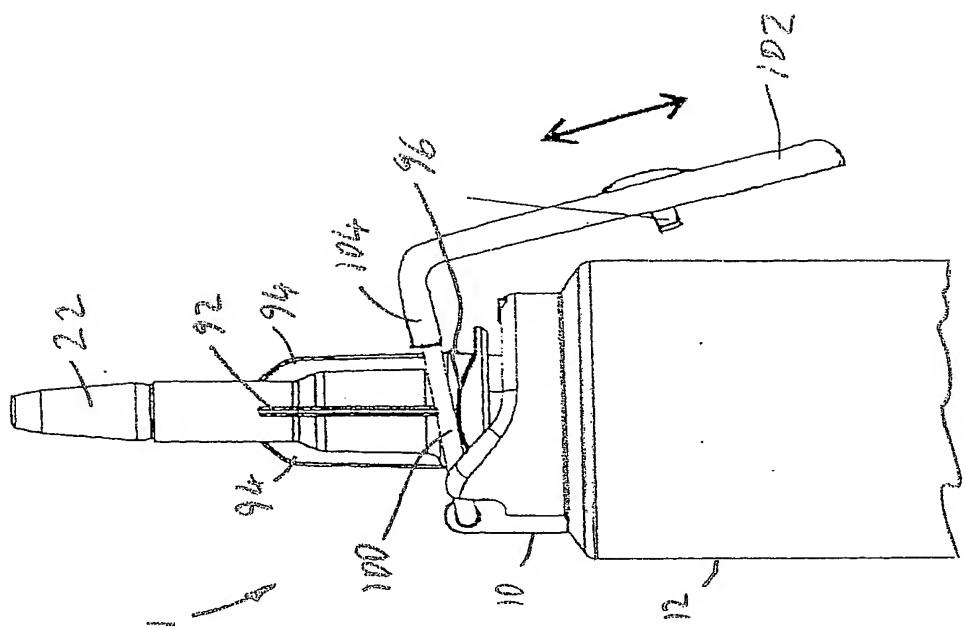


Fig. 3

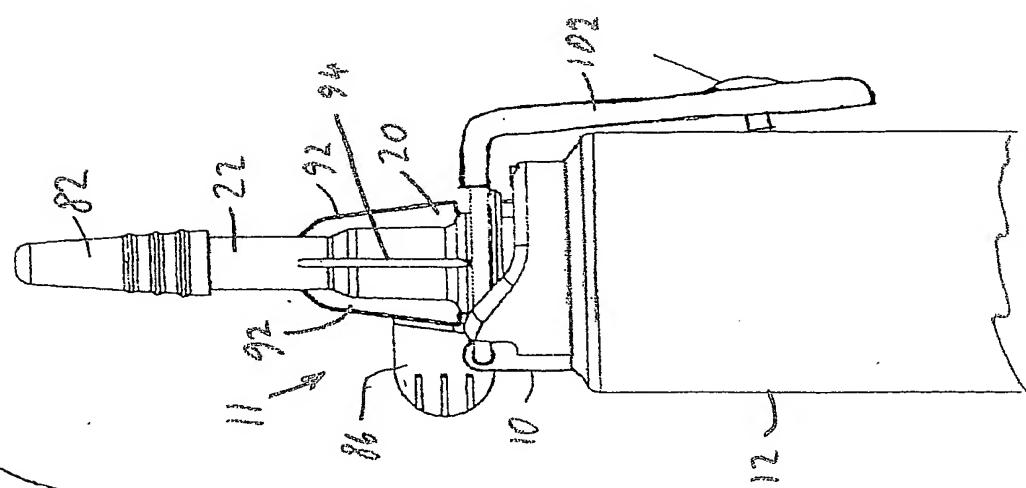


Fig. 2

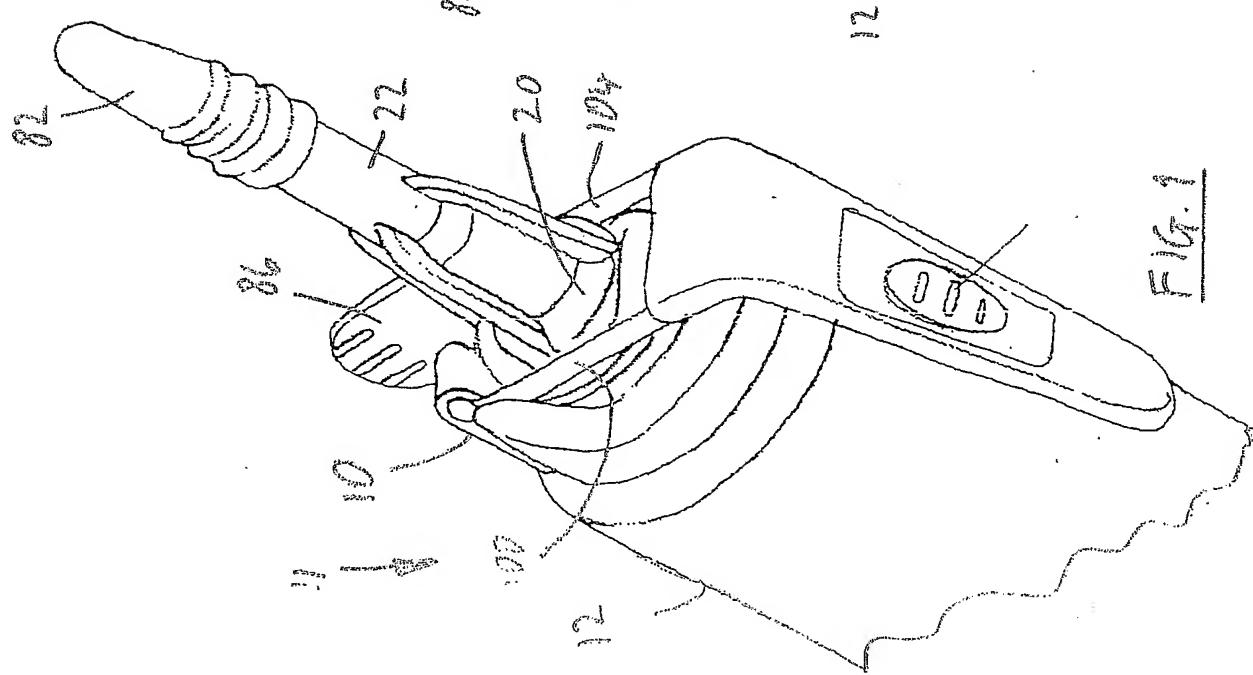
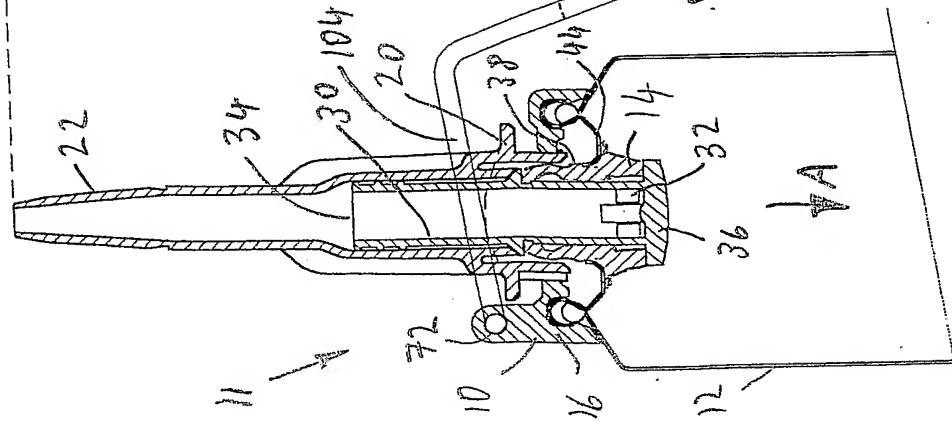
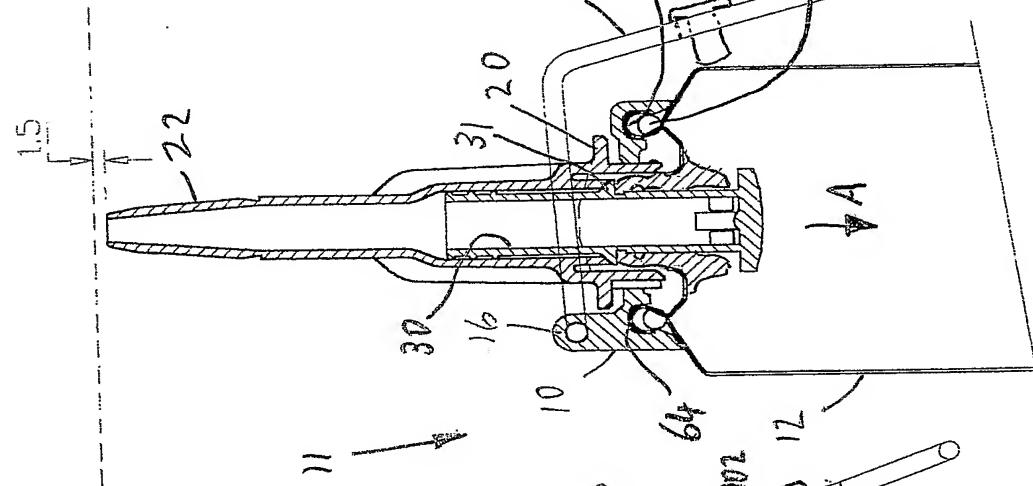
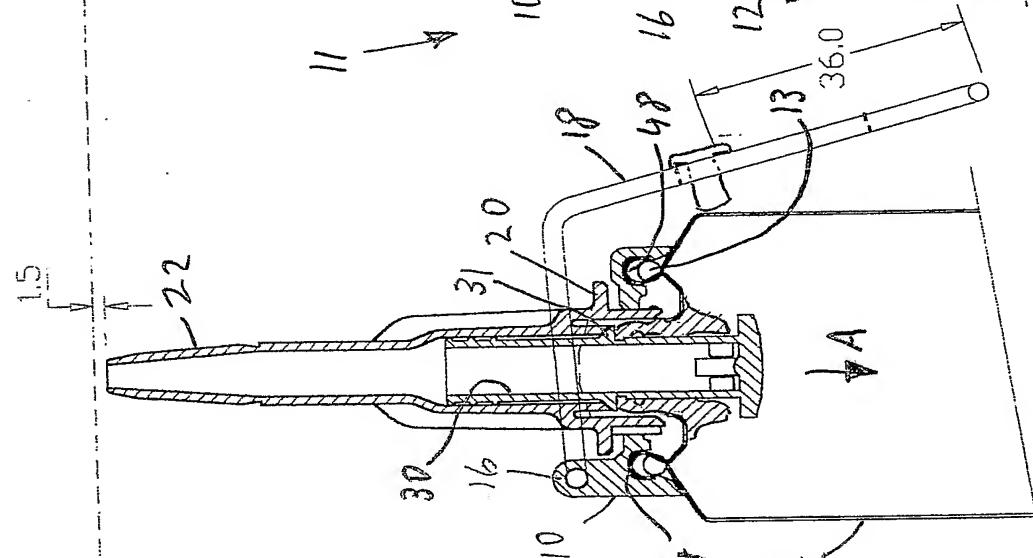
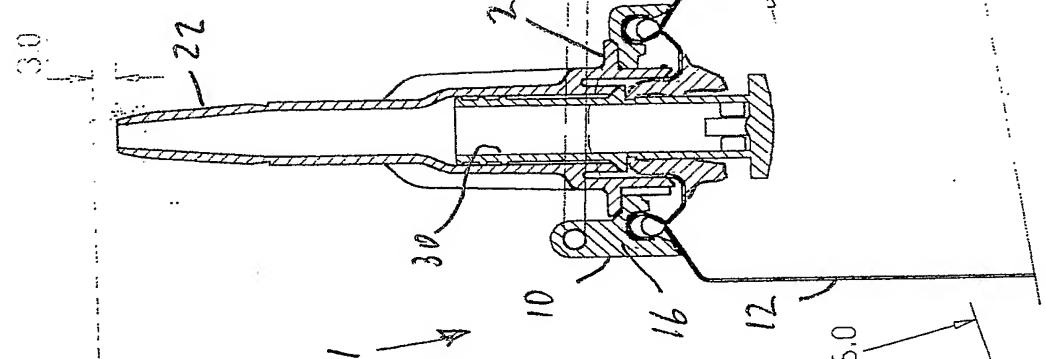
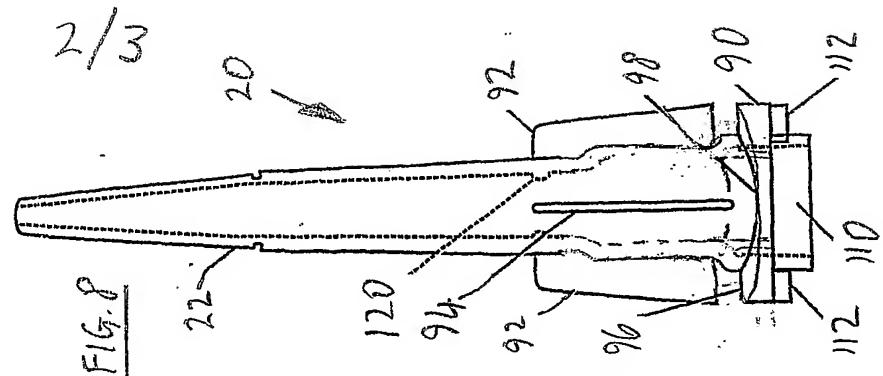
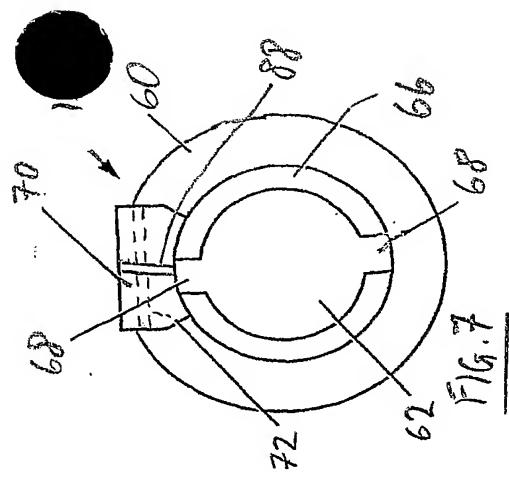


Fig. 1



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